

## TECHNICAL NOTE

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# Standardization Model for Describing the Extent of Burn Injury to Human Remains

**REFERENCE:** Glassman, D. M. and Crow, R. M., "Standardization Model for Describing the Extent of Burn Injury to Human Remains," *Journal of Forensic Sciences*, JFSCA, Vol. 41, No. 1, January 1996, pp. 152–154.

**ABSTRACT:** This paper provides a model for standardizing descriptions of the extent of burn injury to human bodies consumed in fire. Its intent is to simplify and make comparable case reports and legal descriptions by medical examiners, pathologists, crime scene investigators, forensic odontologists, forensic anthropologists, fire fighters, paramedics, and others responsible for recovery, analysis, or identification of burn victims. The Crow-Glassman scale (CGS) is divided into five levels depicting increasing destruction to the body relative to burn injury. Each level relates to a unique set of circumstances that may affect on the recovery procedure, analysis strategy for identification, and choice of personnel most suited for making identifications.

**KEYWORDS:** forensic science, pathology, anthropology, physical anthropology, forensic pathology, forensic anthropology, burn victims, human identification, human remains, burn injury

Numerous personnel and specialists are involved in various aspects of fire destruction to deceased human bodies ranging from the recovery of the body at the death scene to the identification of the victim. These persons include, but are not limited to, fire fighters, paramedics, rescue personnel, National Board of Transportation investigators, crime scene investigators, medical examiners, forensic odontologists, and forensic anthropologists, all of which must submit reports which include descriptions of burned bodies. During the recovery and identification of the Branch Davidians at Mount Carmel in Waco, Texas, one of the authors (RMC) realized the need for a classification system of burn injury victims. To date, there has been no standardized model for describing deceased burn victims; therefore, the potential for confusion between, and elaborate redundancies in, the descriptions by differing investigators exists. As bodies decompose in a somewhat systematic pattern with increasing exposure to fire temperature and duration, a scaling system of body injury due to fire is plausible. A similar model has been long accepted for describing the extent of burn injury in survivors of fire-related encounters described by

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Received for publication 5 Dec. 1994; revised manuscript received 6 April and 24 May 1995; accepted for publication 25 May 1995.

"degrees" defined by the percentage, depth of burn, and extent of burn damage.

In this paper, we propose a classification model to describe the extent of burn destruction to deceased victims of fire. Acceptance of this model by personnel involved in fire deaths would standardize the long, detailed descriptions of burn victims down to simplified codings meaningful in interagency dialogue.

### The Model

The Crow-Glassman Scale (CGS) is divided into five levels. Each succeeding level depicts increasing destruction to the body from burning. For mass disasters, the use of a mass disaster team under the direction of a medical examiner have achieved excellent success. However, more often burn victims occur under the circumstance of isolated fires, such as house fires whereby the interaction of the entire mass disaster team may, or may not, be necessary. A description of the victim or victims by the "first at the scene" to the medical examiner, along with other relevant information, may allow the medical examiner to assess which consultants would be required for each particular death scene. Therefore, saving both time and energy.

*CGS Level #1*—constitutes burn injuries characteristic of typical smoke death. The body may exhibit blistering of the epidermis and singeing of the head and facial hair. Recovery of the body is similar to that for other victims not involving burn injury. The body is recognizable for identification at this level. Fig. 1.

*CGS Level #2*—defines a body that maybe recognizable but most often exhibiting varying degrees of charring. Further destruction of the body is limited to the absence of elements of the hands and/or feet, and possibly, the genitalia and ears. Additional searching near the body is warranted for recovery of disarticulated elements. Identification is made, most often, by the collaboration of medical examiner and forensic odontologist. Figure 2.

*CGS Level #3*—shows further destruction of the body, with major portions of the arms and/or legs missing. The head is present at this level although identity is nonrecognizable. The search area for associated disarticulated remains should be widened. A forensic anthropologist should be included to facilitate successful search and recovery procedures at the death scene. Identification is coordinated by a medical examiner who may require the aid of a forensic

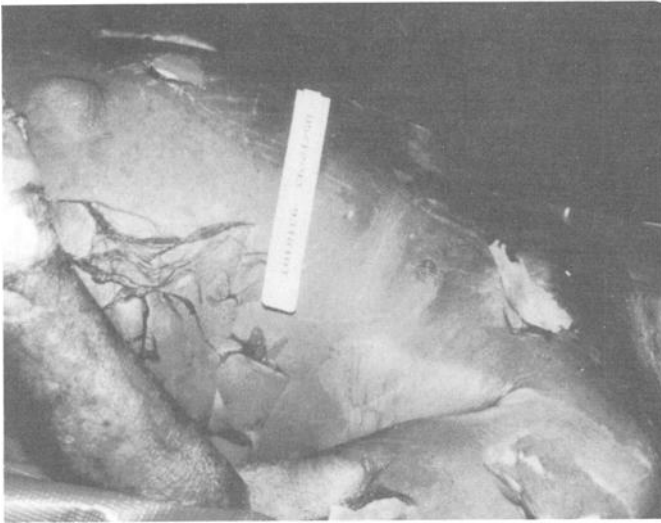


FIG. 1—CGS level 1.

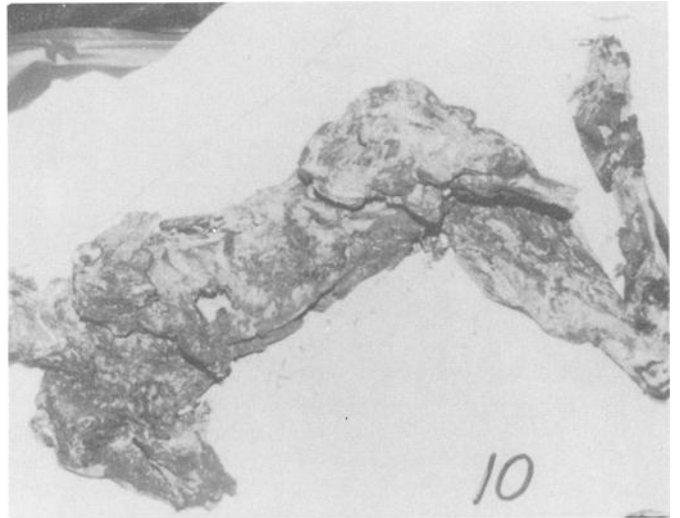


FIG. 3—CGS level 3.



FIG. 2—CGS level 2.



FIG. 4—CGS level 4.

odontologist. If needed, a forensic anthropologist may be called on to determine gender, age, race, etc. from the skeleton. Figure 3.

**CGS Level #4**—corresponds to a degree of extensive burn destruction whereby the skull has fragmented and is absent from the body. Some portions of the arms and/or legs may still remain articulated to the charred body. Search and recovery should be aided by a forensic anthropologist using systematic bioarchaeological methods including screening procedures to locate small body fragments and dental elements. Identification is coordinated by a medical examiner using forensic anthropologist and odontologist consultants as needed. Figure 4.

**CGS Level #5**—represents the final level of the proposed scale. At this level, the body has been cremated and little or no tissue is present. The remains are highly fragmentary, scattered and incomplete. A forensic anthropologist should be an on-site consultant for the identification and recovery of the cremains. Personal



FIG. 5—CGS level 5.

identification is most difficult at this level and a forensic anthropologist may be best trained to interpret cremains for identifying physical attributes of the deceased. Recovery of dental elements will require the expertise of a forensic odontologist. As with all fire deaths, a medical examiner is, mostly likely, the designate to coordinate consultant activities. Fig. 5.

### Discussion

Acceptance of a standardized and universal scale for describing victims of burning should benefit numerous personnel. It would eliminate the need for long subjective descriptions to be made by all investigators involved with a specific burn death. For example, a crime scene investigator could report that “. . . in the front hallway a CGS #3 was found face up. There were two CGS #4's near the ruptured propane tank and a CGS #1 on the bed who is recognized as the apartment owner.” A report of this nature would not only facilitate efficiency at the death scene but, because of the common nomenclature, would provide consistent information to other professionals engaged in recovery, identification and legal concerns.

Death scenes involving burned victims are among the most difficult to coordinate by a medical examiner, particularly in the case of mass disasters such as plane crashes and explosions. Common to these scenes are victims of varied burn injuries such as those found at Mount Carmel, Waco, Texas. Use of a systematic scale for describing burn injury in these cases, such as the proposed CGS, would benefit the management and identification effort.

Adoption of the CGS has been discussed formally at professional meetings of pathologists and odontologists and informally with our colleagues in various areas of forensic science. The response has been strongly positive. We recommend the acceptance of the CGS into forensic practice.

### Acknowledgment

We gratefully acknowledge William C. Rodriguez for providing the photo in Fig. 5.

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